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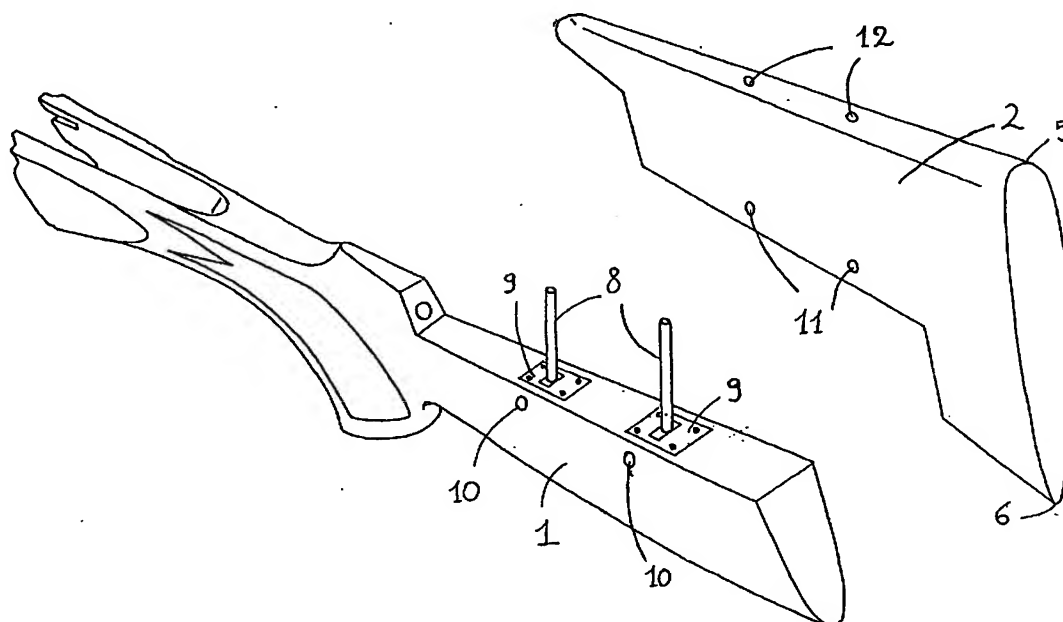
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(54) Title: FULLY ADJUSTABLE STOCK FOR RIFLE



(57) Abstract: Adjustable stock for rifle, characterised in that it is divided into two elements by cutting: element (1) remains integral with the barrels and is connected to element (2), which rests on the shoulder of the shooter, by means of pins (8) whose position can be adjusted by screws (10, 11, 12) which allow relative movement of the two elements both laterally and vertically, one in relation to the other, for accurate regulation of the aim on the target.

WO 2004/013560 A1

## FULLY ADJUSTABLE STOCK FOR RIFLE.

The present invention relates to a stock for rifle which can be fully  
10 adjusted both vertically and laterally and, by means of appropriate  
thicknesses of the butt plates, also in length.

Stocks for rifles are known on the market, above all in relation to the  
world of precision or sport shooting, which are known as "adjustable"  
15 due to the possibility of partially adjusting the shape of the stock,  
improving the support provided for the shooter during shooting.

This is because shooters have different physiques which affect the  
shooting position, in particular the various physical characteristics of  
20 the arm, of the position of the eyes and of the cheekbones affect the  
aim. In the man-rifle interaction, aim refers to the alignment between  
the eye, the shoulder and the line of aim of the rifle: clearly, when  
producing a rifle stock, account has to be taken of a set of  
parameters such as distance and height of eyes, position of the  
25 cheekbones and the extent of their projection, the length of the neck,  
the position of the shoulder whereon the rifle is rested, and the  
length of the arms and height of the person.

These elements are fundamental in the choice of the stock in order  
30 to achieve high precision of shooting, in particular in the case of  
shooting at a moving target for sport, or of marksmen.

The so-called "adjustable" stocks known on the market in actual fact only allow partial adjustments as only part of the stock can be regulated, unlike what is to be illustrated of the present invention herein below.

The most representative patent of the known state of the art is FR 2791767 wherein the part formed by the back, i.e. the upper part of the stock, and by part of the lateral surface of the stock, can be moved both laterally and vertically by means of micrometric screws, only altering the support provided by the stock for the shooter, yet maintaining the alignment between the end of the stock and the barrels of the rifle steady.

Another patent belonging to the known state of the art is US 5235764: only the back can be moved both vertically and laterally, but in this case too the alignment between the barrels of the rifle and the stock end is maintained.

Systems are also known for adjustment of the butt plate, by moving it vertically or moving it away from the stock by means of spacers or pins.

In none of the patents which belong to the state of the art is the axis between the point of resting of the stock on the shoulder and the barrels of the rifle modified: the so-called "adjustment" therefore consists of a relative increase in the comfort for the shooter yet while maintaining alignment of the rifle: in practice adaptability of the shooter to the rifle is favoured, and not the reverse.

The object therefore of the present invention is that of producing a stock which can be fully adjusted and adapted to the shooter, in such a way that perfect alignment of the aim on the target to be hit can be achieved, with a lower likelihood of error on the same target.

A further object of the present invention is that of simplifying the production of the stocks: today's production method is in fact that of producing the stocks in different sizes with an increase in costs and a further complication, as for each model of rifle numerous sizes of stocks have to be produced to satisfy customers who obviously have heterogeneous physiques.

10 Last but not least, the production of the stock according to the present invention enables a saving in materials, above all wood, and a considerable decrease in costs, improving the efficiency of production.

15 The advantages lie therefore in the fact that with a single rifle the needs of people with different physiques can be satisfied, enabling them to adjust their own firearm in the manner most congenial to them without having to level off projections or, worse, change their natural shooting position to adapt better to the rifle.

20 Thus a rifle is obtained which adapts to the person and not the reverse.

25 A further advantage achieved, as will be illustrated herein below, is absorption of the recoil by the stock forming the object of the present invention, as it is no longer a rigid single part but is instead formed by two joined elements: the system which joins the two elements introduces a restraint which increases the elasticity of the body and therefore encourages absorption of the recoil which is not transferred directly to the shoulder but is damped by the connection system.

30 These and other advantages will be made clearer by the description and by the accompanying drawings of a preferred embodiment.

Fig. 1 illustrates the complete stock as it is presented.

Fig. 2 shows the elements which form the stock and the system of connection of the elements.

Fig. 3 is a view from above of how the stock is presented perfectly in line with the barrels.

10 Fig. 4 shows the various types of butt plate which can be attached to the end of the stock to adapt the rifle in a longitudinal direction.

Referring to Figure 1, the stock is formed by the union of two elements wherein element 1 is integral with the breechblock 3 of the rifle and therefore with the barrels, while element 2 rests on the  
15 shoulder of the shooter. On element 2 the nose 4, the heel 5, the tip 6 and, in contact with the shoulder, the butt plate 7, can be seen.

As is clear, the stock consequently appears divided also from a structural point of view: from a rigid body formed by a single piece of  
20 wood as it was originally, it becomes a body formed by two separate elements joined to each other and with different tasks and functions: the union of these two elements forms the actual stock.

25 Moving on to Figure 2, the elements 1 and 2 are joined to each other by means of pins 8, whose ends are attached to the elements 1 and 2 by means of plates 9 which are embedded in either one of the elements forming the stock as described above. Said plates can regulate micrometrically the position of the ends of the pins 8 in a  
30 transverse direction to the stock, as said ends are attached to a worm screw.

In a preferred embodiment, regulation of the horizontal movement of element 1 in relation to element 2 therefore takes place with micrometric regulation of the position of the pins 8 by actuating the screws 10 which move the point of attachment of the pin in a transverse direction, enabling translation (moving both pins 8 in the same direction) or rotation (modifying the position of the pins 8 in opposite directions or adjusting only one thereof) of one element in relation to the other.

10 Vertical adjustment instead takes place both by actuating the screws 12 which regulate the height of the pins and therefore the vertical position of the elements, and by inserting shims between the two elements.

15 Referring to Figure 3, some examples of possible positions which element 2 can adopt in relation to element 1 are illustrated: as can easily be seen, both translations of the whole part and partial relative rotations both in relation to the front pin, with the nose 4 still and the heel 5 moved, and in relation to the rear pin, where vice versa the  
20 heel 5 remains still and the nose 4 moves, are possible.

For longitudinal adjustment of the stock, different butt plate sizes are used, as illustrated in Fig. 4: the system of attachment of the butt is by bayonet coupling of the attachment holes 13 on special pins  
15 formed in the end part of the stock.

Adjustment takes place with replacement of the butt plate with others 7', 7'', 7''' of different thickness which allow optimal adaptation in a longitudinal direction of the rifle to the shooter.

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As can be seen from the drawings and from the description, not only does the appearance of the stock vary but also the general alignment of the rifle with the body of the shooter: a longitudinal

variation with the butt plate and a vertical and horizontal variation are obtained by adjusting the connection pins which adapt the rifle itself to the shooter.

The fact that the stock is no longer a rigid element but is instead composed of two parts introduces elasticity into the same which damps the recoil caused by the shot: although the pins are sufficiently rigid to allow the precision of the aim on the target to be maintained, they will never be infinitely rigid and this allows a  
10 damping element to be obtained.

It is understood that all that is described above is purely a non-limiting description of the different possible embodiments of the invention.

**CLAIMS**

1. Stock for rifle characterised in that it is formed by at least two elements shaped in such a way that element (1) is not in direct contact with the shoulder of the shooter, and element (2) is not integral with the breechblock of the rifle.

2. Stock for rifle, according to claim 1, characterised in that it is composed of an element (1) integral with the breechblock of the rifle (3), an element (2) which rests on the shoulder of the shooter, joined by at least two sufficiently rigid pins (8) attached by one end to plates (9) embedded in either element (1) or (2) of the stock, and attached by the other end by means of screws (11) to one of the plates embedded in either element (2) or (1) of the stock itself.

3. Stock for rifle, according to claim 2, characterised in that the elements (1) and (2) can be adjusted in a vertical direction through regulation of the height of the pins (8) by actuating the screws (12).

4. Stock for rifle, according to claim 2, characterised in that adjustment in a vertical direction of elements (1) and (2) can take place by inserting shims between the two elements.

5. Stock for rifle, according to claim 2, characterised in that the elements (1) and (2) can be adjusted in a horizontal direction by moving the hooking of the pins (8) with regulation of the plates (9) by actuating the screws (10).

6. Stock for rifle, according to claim 1, characterised in that the butt plate (7) is attached to the element (2) of the stock by means of a bayonet coupling.



7. Stock for rifle, according to claim 1, characterised in that the stock can be adjusted in a longitudinal direction by changing the thickness dimension of the butt plate (7).

8. Stock for rifle, according to claim 1, characterised in that, by means of appropriate regulations, the alignment can be modified both in a vertical and horizontal direction between the end (5) of the stock in contact with the shoulder of the shooter and the breechblock (3), and therefore the barrels, of the rifle.

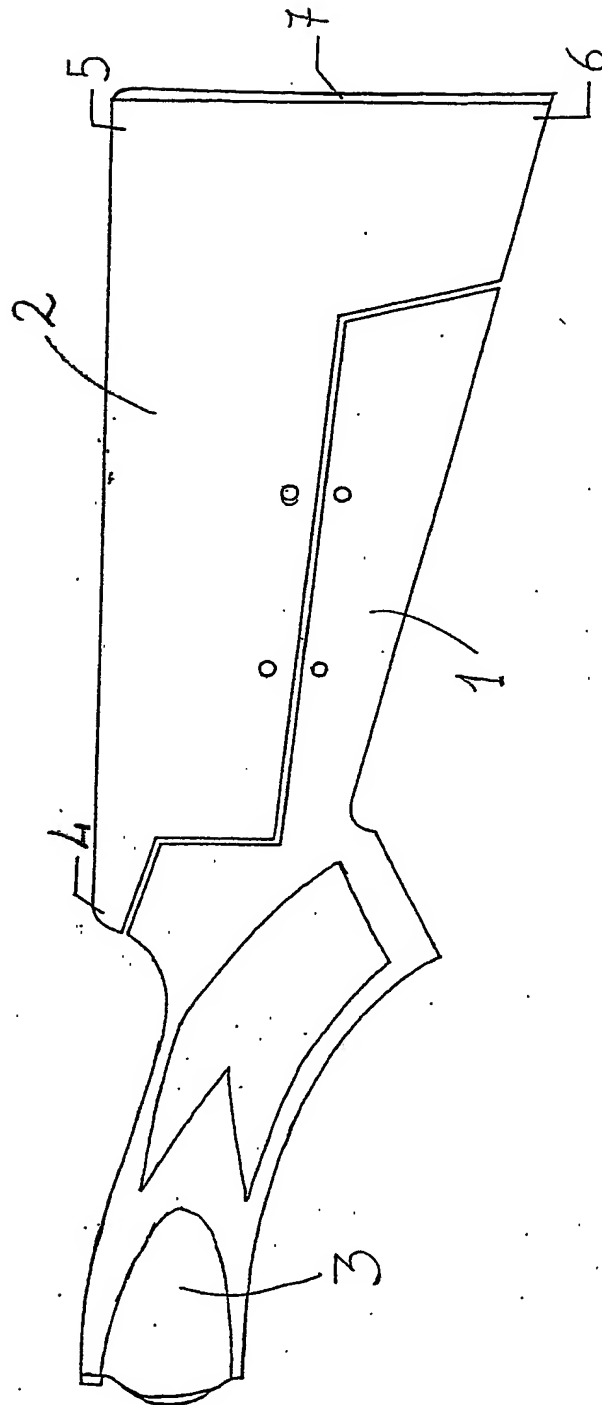


Fig. 1

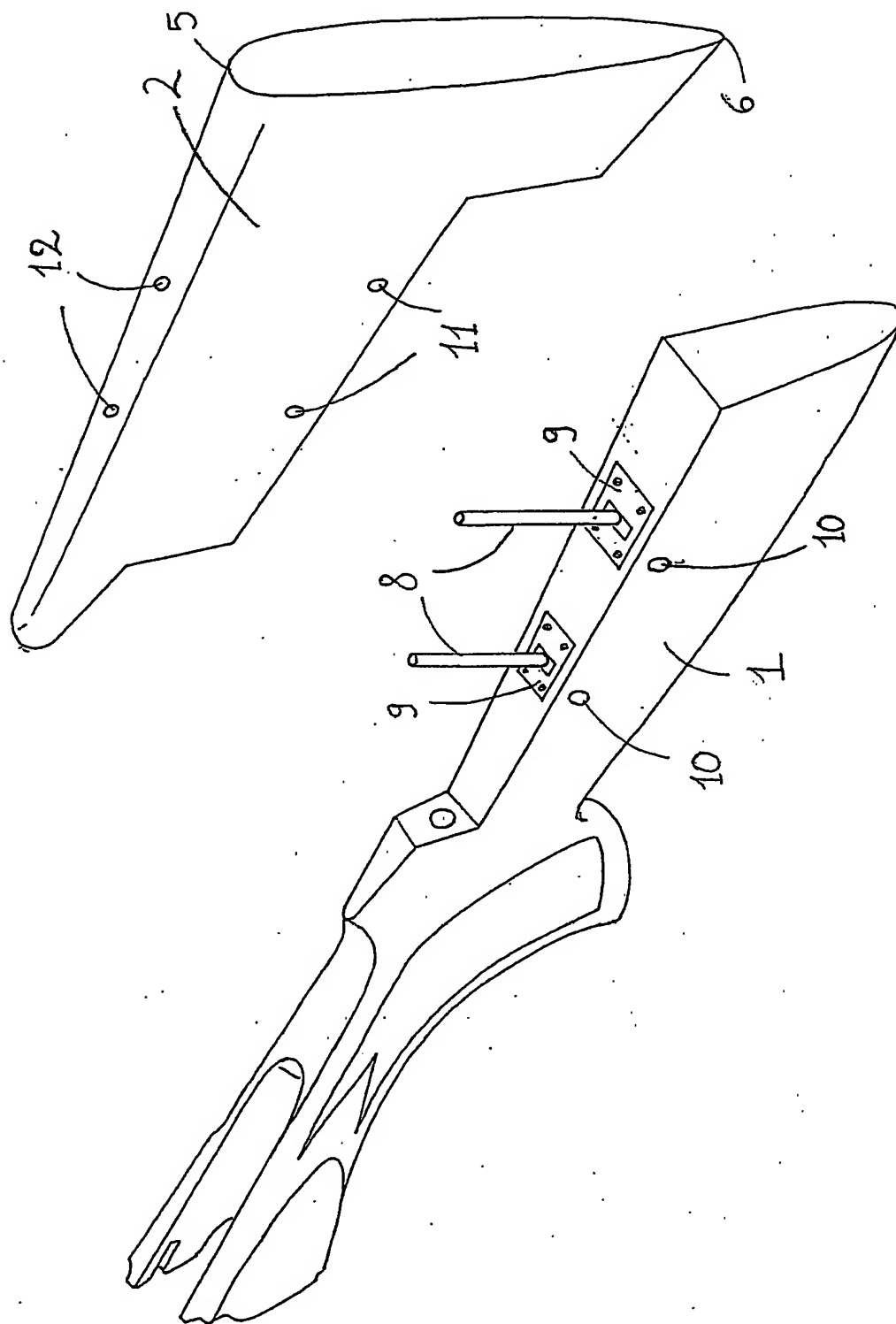


Fig. 2

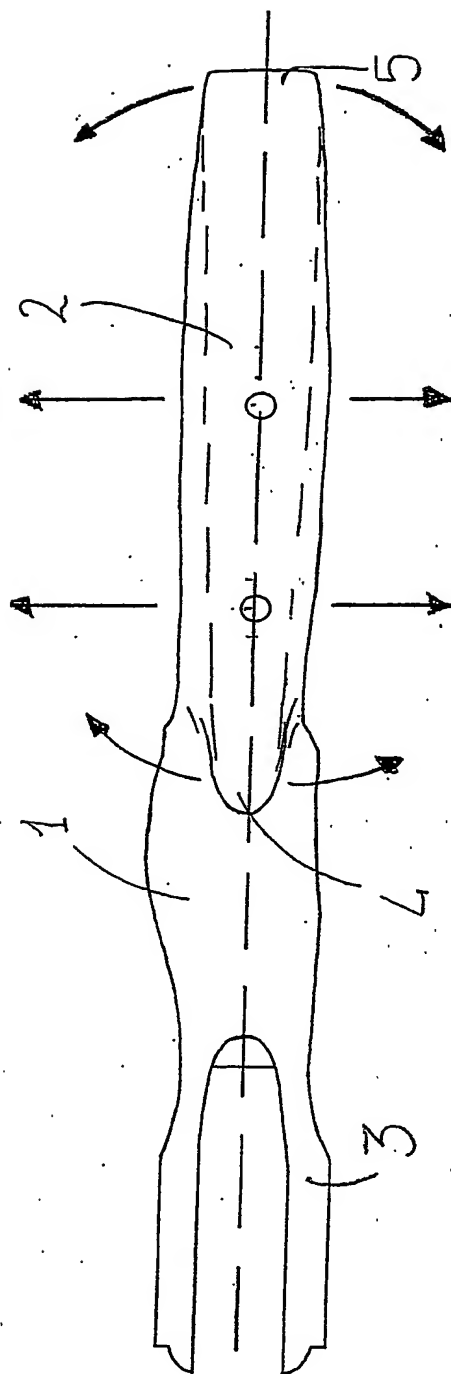


Fig. 3

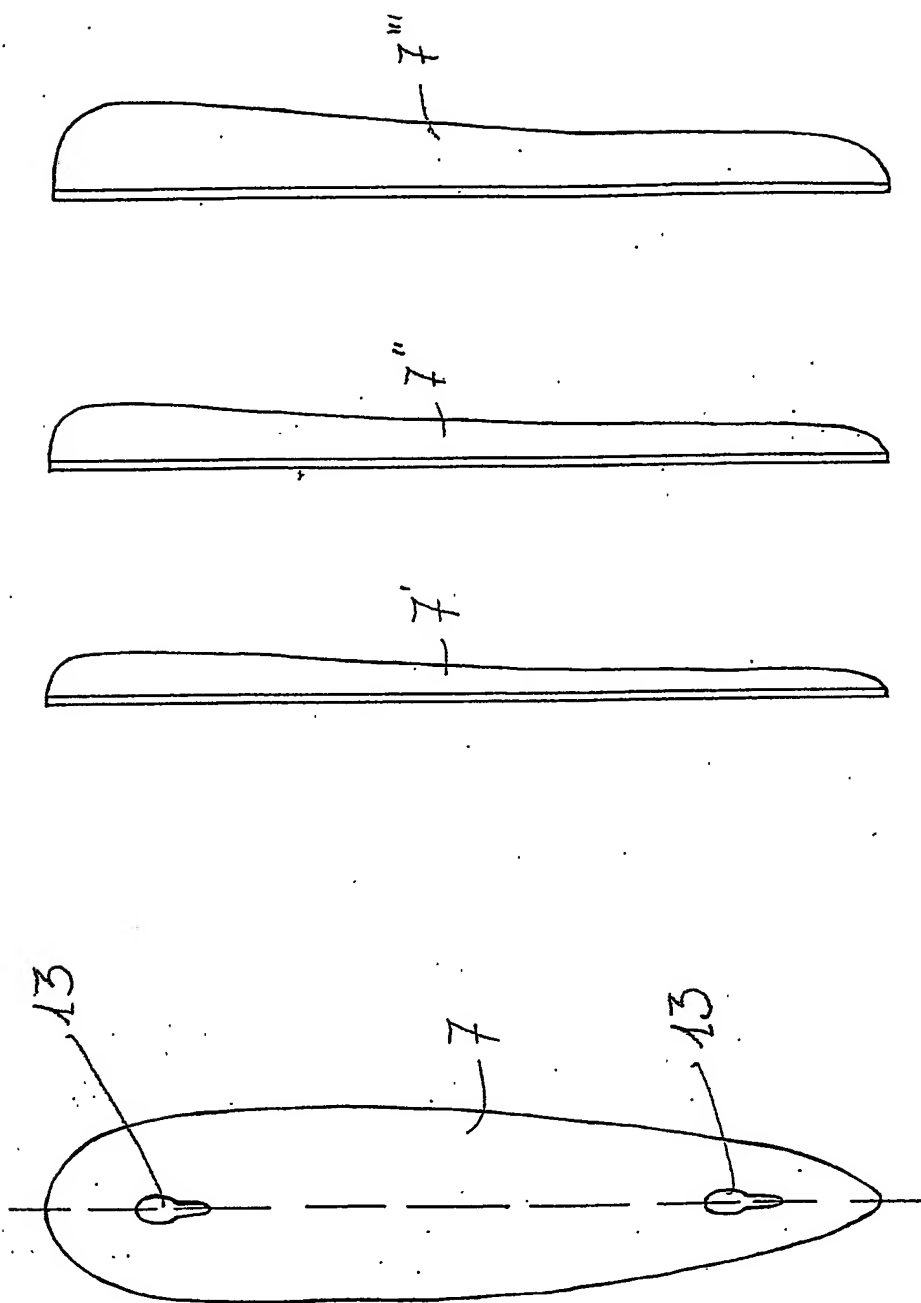


Fig. 4

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International Application No.

PCT/EP 03/08302

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F41C23/14

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F41C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CH 96 004 A (JOHANNES SIEGRIST) 1 September 1922 (1922-09-01)	1,8
Y	column 2, line 10 -column 3, line 22; figures 1-3	6,7
X	US 5 970 642 A (MARTIN BILLY B) 26 October 1999 (1999-10-26) column 5, line 31 -column 6, line 24; figures 1,5	1,6,7
X	US 4 532 730 A (HYYTINEN TIMO) 6 August 1985 (1985-08-06) cited in the application abstract	1,7
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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International Application No

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 791 767 A (CHAPUIS ARMES) 6 October 2000 (2000-10-06) cited in the application	1
Y	the whole document	7
X	DE 101 14 199 A (RAPPENHOENER HANS RICHARD) 15 November 2001 (2001-11-15) paragraph '0018!; figures 2,3	1,8
X	FR 1 170 937 A (PALLARD LOUIS) 20 January 1959 (1959-01-20)	1
Y	figure 6	6

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/08302

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
CH 96004	A	01-09-1922	NONE	
US 5970642	A	26-10-1999	NONE	
US 4532730	A	06-08-1985	FI 66084 B FR 2536163 A1 IT 1169692 B	30-04-1984 18-05-1984 03-06-1987
FR 2791767	A	06-10-2000	FR 2791767 A1	06-10-2000
DE 10114199	A	15-11-2001	DE 20005673 U1 DE 10114199 A1	25-05-2000 15-11-2001
FR 1170937	A	20-01-1959	NONE	